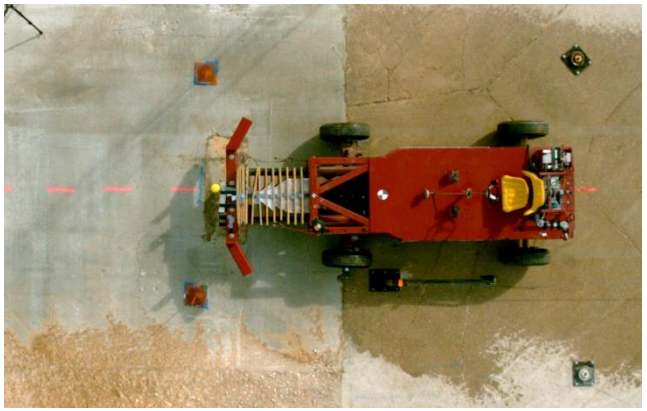
0.000 s

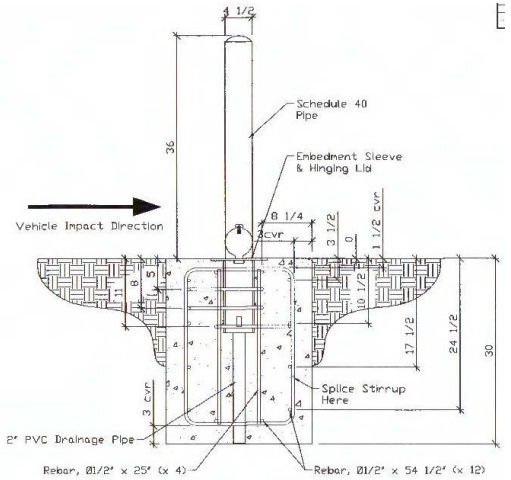
0.050 s

0.100 s

0.150 s



At maximum deflection of bollard



General Information
- Test Agency ..... Texas A&M Transportation Institute (TTI)
- Test Standard Test No. .... ASTM F3016-14 S10
- Test No. 690900-BLD4
- Date 2018-08-09

Test Article
- Type ..... Low-Speed Bollard
- Name ..... CR 4-inch Bollard
- Material or Key Elements . 4-inch schedule 40 pipe protruding 36 inches above ground level embedded in a reinforced concrete foundation 30 inches deep, 24 inches wide, and 60 inches long
- **Soil/Foundation Type** ..... 3-inch thick reinforced concrete area slab cast on 6-inch layer of compacted road base, on top of 39-inch thick layer of washed sand

Test Vehicle
- Type ..... Low-Speed Bogie
- Designation ..... Surrogate (S)
- Model ..... ASTM F3016-14 Bogie
- Test Inertial Mass ..... 5020 lb

Impact Conditions
- Speed ..... 9.9 mi/h
- Angle ..... 91.5°

Occupant Risk Values
- Longitudinal OIV ..... 15.7 ft/s
- Lateral OIV ..... 0.7 ft/s
- Longitudinal RDA ..... 0.5 g
- Lateral RDA ..... 0.3 g

Max. 0.050-s Average
- Longitudinal ..... -2.7 g
- Lateral ..... -0.2 g
- Vertical ..... 0.2 g

Debris Field ..... No debris

Final Rest of Bogie ..... 47 inches rebound

Dynamic Bogie Nose Crush ..... 13.6 inches

Rotation/Translation of Bollard (static after impact) ..... 15°

Horizontal Movement of Foundation ..... None
Uplift of Foundation ..... None
Dynamic Penetration of Bollard ... 10.9 inches
Dynamic Penetration of Bogie… 3.3 inches
Maximum Dynamic Penetration .. 10.9 inches
Penetration Rating S10/P1

Figure 6.8. Summary of Results for *ASTM F3016-14* test S10 on CR 4-inch Bollard.